

of mental performance? There is, no doubt, more of vagueness and difficulty in this, but the principle, though less clearly defined, will be found to hold here as in the other cases.

There are two kinds or grades of mental activity which, although imperceptibly shading into each other, may nevertheless be broadly distinguished as higher and lower. Intellectual action constantly tends to become automatic. Actions frequently repeated acquire a tendency to repeat themselves. They become so easy as to cost little effort, and it may at length require exertion to stop them. This is the meaning of the power of habit. Incomparably the larger portion of the world's thinking is of this kind. People think and act as they are in the habit of thinking and acting. They converse, harangue, write, implore, and pray, in the set phrases which they have acquired by imitation and repetition. This kind of automatic mental action, as it is allied to the mental workings of the inferior animals, may be regarded as the lower form of intellectual manifestation.

The higher form of thought is less mechanical, and consists in bringing the mind to bear upon the materials before it. It is to reflect, to compare, to judge, to make new combinations, to form independent conclusions—in short, to "make up one's mind." To revise the data of opinions, and breaking out of the beaten track to form new opinions more in harmony with the facts, is the highest function of mind; and it is just as essentially displayed by the mother when she contravenes fashion and conforms to reason in the dressing of her child, or by the merchant in weighing the trustworthiness of a candidate for credit, as by the philosopher in forming a new scientific theory.

Now these two forms of mental activity have their respective physical conditions and accompaniments. That higher mental action which involves the establishment of new relations among the elements of thought, involves also the highest action of the organ of thought. The brain draws upon the system for a greater supply of blood, and the cerebral changes, of which oxygenation is the mainspring, proceed at an accelerated rate. On the contrary, automatic mental activity, employing as it does less effort, involves a less amount of cerebral change, and may take place in less perfect conditions of change.

It is therefore clear that to these two grades of mental action the air which impels the thinking mechanism stands in very different relations. In fact, as there are two qualities of thought depending upon two sets of cerebral conditions, so there are two states of the air which correspond to those conditions. To maintain the higher form of cerebral activity, air of perfect purity is required; impure air disturbs and defeats it. On the other hand, the easier processes of automatic thinking go forward with little or no disturbance in vitiated air. There is then a state of mind to which pure air is essential, and another with which foul air is congenial. Contaminated air is more favorable to routine work, and the mental processes that have become habitual, than to those which involve a critical and questioning deliberation. Fresh air raises the spirits, stimulates hope, and encourages to action: foul air depresses the spirits, favors gloomy and discouraging views, and thus paralyzes action. Air loaded with contaminations, as it tends to mental dulness, is therefore congenial with the stupidities of blind tradition and the stolidities of unreasoning conservatism. On the contrary, pure air, by quickening the highest cerebral functions, favors freedom and boldness of thought, enlargement of view, and consequent independence of action. As the mass of people accept their opinions ready made, and fall spontaneously into ruts of thought, they are naturally and instinctively content with bad ventilation, while those who put their brains to their highest possibilities are so few that their protests, if made, are unheeded.

There is an important hint here for the guides of public opinion: Why should they not have an atmospheric policy? If the old fogies will assiduously plug up the apertures of their

AIR AND THOUGHT.

IT is related of Alexander the Great that, having captured some outlandish barbarians, he consulted his scientific adviser, Aristotle, as to the propriety of killing them. Aristotle recommended an inquiry into their physical circumstances, and particularly as to the *air* they had breathed, before deciding whether or not they were worth saving. Though this was putting rather a serious aspect upon bad ventilation, yet, in connecting the quality of the air with the character of the people respiring it, we are persuaded that the old Stagirite was not so far wrong as many may suppose. Let us look a little into the connection as traced in the light of our better knowledge.

It is now well established that mental activity depends upon cerebral activity, and that cerebral activity in turn depends upon oxygenated blood. The character of the mental organ qualifies that of intellect in all its grades, from the idiot who cannot feed himself to a Napoleon Bonaparte who aspired to rule the world. But whether the brain be good or bad, the quality of its action depends immediately upon the oxygenating process. Of course, no amount of oxidation could cause the brain of an idiot to evolve high mental results, for the organ of thought is structurally deficient; but no brain, whatever its grade, can do as good work or as much work, where this process is defective, as where it is perfect. Beings of a lower organization are, of course, less disturbed by atmospheric impurities than those of a higher character, for the more complex the mechanism and the finer the effects it produces, the greater is the necessity for nicety and completeness of conditions. No doubt when the brain is lowered in efficiency by impure air, it is possible to exalt its action by artificial stimulation with tea, coffee, tobacco, or alcohol (and it is unquestionably a cause of their frequent employment); but this does not disturb the truth of our statement, for the transient effect will undoubtedly be greatest when these stimuli conspire with perfect atmospheric conditions.

We have spoken of degrees of perfection in the structure of the brain; of degrees of perfection in its oxidizing processes, and of degrees of perfection in the mental results. The two former are obviously measurable. The anatomist reports on the amount of cerebral nerve-matter and the degree of its organization. The chemist defines purity of the air, and gives us the scale of its deteriorations. But can the psychologist speak with equal definiteness of the corresponding grades and amounts

assembly-rooms, and the progressives will hold their conventions in the open air, they will do quite as much to promote their respective ends as can be accomplished by all the arts of rhetoric. Truth, we doubt not, has inscrutable affinities with oxygen ; while error, like the reptiles of old, flourishes in an atmosphere laden with carbonic acid.

In affirming this relation between the highest action of the mind and the quality of the air respired, we are not dealing with wire-drawn fancies. There is more in this idea than is dreamed of in our current philosophy, as every student can testify who heeds the conditions of his best mental exertion.

We began by quoting an alleged opinion of the greatest man of science in the ancient world, and may fitly close by referring to the greatest man of science in modern times. The immortal discoverer of the law of universal gravitation probably did more original and powerful thinking than any other man who ever lived. His great brain, when wrought to its highest capability, revealed a new order of the universe. How did this mighty thinker stand on the question of air and ventilation ? His record is conspicuous. Knowing nothing of what the air is composed, and nothing of the nature of the respiratory process, the dictates of sensation were sufficient, and he scrupulously obeyed them. Sir Isaac Newton was a member of the British House of Commons, and during the whole course of his parliamentary career he is reported to have made but one speech, and that a very brief one. He arose and asked a person in the gallery to open a window.